



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

THE PROBLEM OF BYZANTINE NEUMES

THE musical notation of Greek liturgical manuscripts from the tenth to the thirteenth century has long been a puzzle to investigators,¹ although the notation from the thirteenth century onwards can be read with virtual certainty. The earlier, at present obscure, system may be called the Linear Notation (Abbr. NL) while the later decipherable system is called the Round Notation (NR). These notations have some common features.² Both contain: (1) Interval-signs, (2) Martyriae or key-signatures, giving the mode of every hymn, (3) Hypostases or subsidiary signs, indicating duration, expression, or other peculiarities of execution. The melody is not given, as in our music, by shewing the pitch of every note. From the Martyria we can infer the pitch of the first note alone. All subsequent progressions are reproduced by the interval-signs, which tell us how far above or below the preceding tone any given syllable is to be sung.³

The Martyriae are in most cases simply the first four Greek letters, giving the number of the mode, with the abbreviation $\pi\lambda$, or π^λ for the plagal modes. The third plagal is called Barys or "deep," and its name is sometimes abbreviated. Various

¹ Authorities: Am. Gastoué, *Introd. à la Paléogr. mus. byz.*; H. Riemann, *Die byz. Notenschrift*. Only these two writers have seriously attempted to transcribe music of the Linear System. Neither, so far as I can judge, has been successful. P. J. Thibaut, *Origine byz. de la Notation Neumatique de l'Eglise latine*, discusses many of the symbols.

² The comparison of the musical setting of hymns extant in both notations only proves a general likeness, but does not enable us to identify any formula definitely.

³ For the Round System cf. (besides the books already mentioned) O. Fleischer, *Neumenstudien*, T. 3 (This is the most useful for beginners, but only deals with the latest phases of NR); U. Gaisser, *Les Heirmoi de Paques*. My articles in *B.S.A.* XVIII, and in *Musical Antiquary*, January and April, 1911, and July, 1913, also deal with the Round System. In *B.S.A.* XIX, I tried to discuss some points in the earlier Linear Systems.

theories are held as to the tonality of the eight modes. But in the present case they do not concern the matter at issue, for (1) the interval signs are independent of tonality; and (2) the Martyriae passed unchanged from the Linear to the Round System, so that any satisfactory account of their nature in the later notation will apply *ipso facto* to the earlier. For our purpose we may take the most generally held view of the modes, which may be found in the works of Gastoué and others.

If we compare the interval-signs in the two notations, we notice: (1) Of the fifteen signs found in the Round Notation twelve can be traced in the Linear; (2) in many cases familiar groups of signs seem to be common to the two systems (but not necessarily with the same value); (3) NL has a number of interval-signs which did not survive in NR. Some may have been altogether lost; but the majority were retained as subsidiaries of various kinds; (4) some of the subsidiaries in NR seem to be already established as such in NL. The main difficulty lies in our ignorance of the laws of subordination enforced in the Linear System. In NR certain signs lose their interval-value when combined with certain other interval-signs. This is called Hypotaxis. The rules are very complicated; but the mediaeval handbook called the Papadike¹ gives them clearly, and tabulates most of the combinations in use. But for the Linear System we are entirely in the dark. Thus, if *a* and *b* are two signs, we are left wondering whether a formula like *a/b* has the value of *a* plus *b*, or *a* alone or *b* alone. Uncertainty of text, which we have no means of rectifying, greatly adds to the difficulty of approaching an unknown notation. After many trials and experiments with the methods of other theorists, as well as with all those that seemed at all possible to myself, I am venturing to suggest the following scheme of interval-values for the various signs.² In the case of group-formulae any proposed evaluation is largely guesswork. For convenience I give the signs the names

¹ Published by Fleischer, *op. cit.*

² In 1912 I was enabled by the generous provision of grants from the Carnegie Trust for the Scottish Universities, and also from the Hort Fund of the University of Cambridge, England, to visit Mt. Athos and Sinai, where I photographed a large number of MSS. (I have since made trial versions of about 200 hymns in the Linear System.) My work was greatly helped by the kind encouragement of His Blessedness the Archbishop of Sinai and by the Brethren at the Monastery, where I had every facility for research afforded to me.

attached to them in the Round System, except where difference of usage might make this misleading. In Figure 1 are exhibited the interval signs used in the latest stage of the Linear System.

Figure 1 displays the Linear System of Byzantine Musical Notation, showing 23 numbered interval signs and their application in three staves of Greek text.

The interval signs are numbered 1 through 23, each with a specific symbol and a letter (a, b, c, d) indicating the interval. The signs are arranged in four rows:

- Row 1: 1 (a), 2 (b), 3 (a), 4 (b), 5 (c), 6 (d)
- Row 2: 7 (a), 8 (b), 9 (c), 10 (d), 11 (a), 12 (b), 13 (c), 14 (d), 15 (a), 16 (b), 17 (c), 18 (d), 19 (a), 20 (b), 21 (c), 22 (d), 23 (a)

The signs are then applied to three staves of Greek text, illustrating their use in notation. The text is written in a stylized, ancient Greek script.

Staff 1: 1 ^{ἦχος} Δ ^{ΕΝ} ΤΩ ΟΥΡΑ ΝΩΙ. ΤΑ ΟΜΜΑ ΤΑ ΕΚ ΠΕΜ ΠΩ
 ΜΟΥ ΤΗΣ ΚΑΡΔΙΑΣ. ΠΡΟΣ ΕΞΩΤΗΡ. ΩΣΟΝ ΜΕ ΤΗ

Staff 2: 2 ^{ἦχος} Δ ^{ΕΠΙ} ΛΑΜΨΕΙ. 2 ^{ἦχος} Δ ^Α ΓΙ ΨΙ ΠΝΕΥ ΜΑ ΤΙ. ΠΑΣΑ Η
 ΚΤΙ ΣΙΣ ΚΑΙΝΟΥΡΓΕΙ ΤΑΙ. ΠΑΛΙΝΔΡΟΜΟΥΣΑ ΕΙΣ ΤΟ ΠΡΩ

Staff 3: 3 ^{ἦχος} Δ ^{ΤΟΝ}. Ι ΣΟΣΘΕ ΝΕΣ ΓΑΡ ΕΣΤΙ. ΠΑΤΡΙ ΚΑΙ ΛΟΓΩΙ.
 3 ^{ἦχος} Δ ^{ΔΕΥΤΕ} ΑΝ ΥΜΝΗΣΩΜΕΝ ΛΑΟΙ. ΤΗΝ ΤΟΥ ΣΩ
 ΤΗ ΡΟΣ ΤΡΙ ΗΜΕΡΟΝ ΕΓΕΡCΙΝ. ΔΙ ΗΣ ΕΛΥ ΤΡΩΘΗ
 ΜΕΝ. ΤΩΝ ΤΟΥ ΧΙΔΟΥ ΑΛΥ ΤΩΝ ΔΕCΜΩΝ. ΚΑΙ Δ
 ΦΘΑΡCΙΑΝ ΚΑΙ ΖΩΗΝ. ΠΑΝ ΤΕC ΕΛΑΒΟ ΜΕΝ. ΚΡΑ
 ΖΟΝ ΤΕC. Ο CΤΑΥΡΩΘΕΙC ΚΑΙ ΤΑ ΦΕΙC ΚΑΙ ΑΝΑCΤΑC.
 CΩCΟΝ ΗΜΑC ΤΗ ΑΝΑCΤΑCΕΙCΟΥ. ΜΟΝΕ ΦΙΛΑΝΘΡΩΠΕ.

FIGURE 1.—LINEAR SYSTEM OF BYZANTINE MUSICAL NOTATION

- 1) Ison: Repeated note, as in NR.
- 2) Ison: This is the older form, and is alone found in the middle stage of NL. (In NR it is called Oligon, and = a second upwards.)
- 3) Apoderma (or Apodoma): Another stationary sign, used mostly at the end of phrases to express a repeated and sustained note. (In NR it has a similar use, but never stands alone.)
- 4) Oxeia, and 5) Petaste: Both, as in NR, denote an ascending second.
- 6) Kentema: Never used alone, but adds an ascending second to some other sign. The result may be a leap of a third. (In NR it makes, when attached to some other sign, an ascending third or fourth.)
- 7) Kentemata (*δύο κεντήματα*): Not used alone, but adds an ascending second, which is always taken by step (so in NR).
- 8) Hypsele: Usually seems to have no interval-value, but to indicate in combination with the ascending signs (4) or (5) and (6) that a large upward interval, generally a fifth, may be sung instead of the third which was actually reckoned. This device was perhaps meant to aid inexperienced singers, who might, if they preferred, sing the smaller interval, ignoring the Hypsele. (In NR it is never used alone; but with Oxeia or Petaste, it makes an ascending fifth or sixth.)
- 9) Apostrophus: Descending second, as in NR.
- 10) Bareia: Descending second. In NR it is a subsidiary with no sound.
- 11) Hyporrhoe: Two successive seconds downwards, as in NR. It cannot be the first symbol over a syllable.
- 12) Chamele: Usually in combination with Apostrophus. It turns a second into a fifth (or perhaps sometimes a fourth) without changing the interval-value (*i.e.*, the following interval will be reckoned as if a second, not a fifth, had been sung). A similar device has been noted with the Hypsele, No. 8 above. (In NR Chamele is never used alone, but makes with Apostrophus a descending fifth or sixth.)

Compound Signs.

- 13) Diple, or double Oxeia: It has the same sound as Oxeia, but indicates a note of double length. In NR it only lengthens a note, but has no sound.
- 14) Kratema (or Choriston?), and 15) Xeron Klasma: Ascend-

ing second with prolongation. Both are compounds whose elements are traced in the older NL; 14 is a stylised form of Petaste above Diple (one losing its interval-value by Hypotaxis), while 15 is made up of Diple and Klasma (No. 20 below). (These have no sound in NR.)

16) Kouphisma: This in NR = a second upwards, which is probably its value here. Form c. is always over two notes. The dot is probably the archaic point marking the conclusion of a phrase.¹ Some ornament is perhaps included, as the symbol *may* be made up of Petaste, Klasma and Hyporrhoe.

17) Double Bareia: Has the same value as the simple Bareia, but prolongs the note. (In NR it is called Piasma, and has no sound.)

18) Double Apostrophus (Ἀπόστροφοὶ σύνδεσμοι): Descending second with prolongation. Form a. is thus used in NR also. Two Apostrophs *vertically* superposed keep their full value—two descending seconds.

19) Kratymohyporrhoeon: Compound of 14 and 11, probably = an ascending and two descending seconds, the first note prolonged. In NR only the descending portion counts.

Groups of Signs.

The following rules of subordination appear to hold: (1) Ison annuls an ascending sign placed below it. (2) Diple is annulled not only by Ison but also by Oxeia, Petaste, another Diple or a descending sign placed above it.² (3) Bareia (whether single or double) is annulled by Apostrophus, however placed.

In other cases all the signs in a group keep their proper sound and interval-value.

Subsidiary Signs.

The following are classed as Hypostases or subsidiaries, because they never stand alone in the late Linear Notation, and appear to have no sound or interval-value.

20) Klasma (later also called Tzakisma): Probably indicates a staccato note with moderate emphasis.³ So in NR.

21) Argon (?) This sign seems to indicate a very slight prolongation—so slight that the transcriber would merely put a

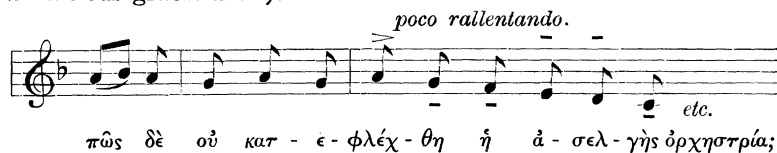
¹ This is regularly used in early neumatic MSS. eg. Laura B. 32: cf. Riemann, *op. cit.* p. 79.

² The effect of a grace-note may result from this collocation.

³ I have not expressed this in my versions. The effect will be sufficiently rendered by the intelligent singing of the words themselves.

small stroke over the note concerned. Some MSS. are very fond of this sign, as the following extract shows:

Hymn for Death of S. John Baptist, August 29th (Cod. Sinaiticus graec. 1217).



Here it occurs four times in succession. (Form c. is the Argon of NR, which seldom uses it.)

A somewhat larger half-circle is used in NR for a descending *third* (called Elaphron). It is possible that it is similarly used in late examples of NL in conjunction with the Apostrophus. But so far the instances are too few to warrant any definite conclusion.

22) Tinagma (?): Perhaps a tremolo. The Kylisma of NR may be the same.¹

23) Parakletike or Enarxis (?): Used at the beginning of a phrase, probably as a mark of expression (παρακαλεῖν = to entreat or exhort). It seems to have no sound or interval-value in late NL, though in the archaic forms it may have had.

These signs, most of which occur several times in course of our examples, are the commonest of the many subsidiaries used in the Linear Notation. For fuller details and conjectures the reader is invited to look elsewhere.²

General Rules for Transcription.

In every mode one or other of the finals may be used as a starting-note: it is easy to find by trial which is the more convenient. After any phrase has ended on a cadential note, we may make a fresh start from one of the other starting-notes³ (I show this by a wavy line in the transcript). As our system uses no sign of more than a third interval-value, the above method was the easiest way of making a leap when desired.⁴

¹ Fleischer, *op. cit.* p. 52 and 53, no. 6.

² Gastoué, *op. cit.* pp. 14, 33. Thibaut, *op. cit.* 34, 51, etc.

³ Whether the sequence can also be broken after notes only used for *medial* cadences (e.g., *f* in Mode I, where the proper finals are *d* and *a*) is at present uncertain.

⁴ Riemann's theory (*op. cit.* p. 57) that every phrase, no matter where the preceding one ended, must start from the "final," is not only most inconvenient in practice, but deprives us of almost all check on the transcription. Moreover, the division of phrases is itself often uncertain.

In the Round System, which was well supplied with signs for large intervals, this was not necessary. The return of the last phrase to the proper final is the chief test of the accuracy of transcription. When this fails, it means either that the MSS. is at fault, or else that the interval-signs have not been properly read.

The rhythm of Byzantine music is a matter of some uncertainty. The question, like that of tonality, affects all stages of the notation, and is independent of the interval-signs. I adopt provisionally the simplest possible method,¹ by which every plain note is counted as a quaver, and a prolonged note as a crochet. A small double-bar marks the end of a phrase (usually indicated by a dot in the MS. text). The other bars do not answer to anything regularly occurring in the MSS., but are put in to aid the singer. It is generally admitted that the musical accents follow the word-accents, on which Byzantine prosody mainly depends.

Examples.

The three short hymns here reproduced can be read very easily by the rules already given. The first and second are parts of antiphones from the Octoechus²: the third is from the *Stichera Anastasima* ascribed to Anatolius,³ and also included in the Octoechus. Mode I has *a* and *d* as its Finals. Mode IV usually starts on *g*. Sometimes, as here, it needs *c* as its lower final, in which case the signature of one flat is required.

PARTS OF TWO ANTIPHONES FROM THE OCTOECHUS COD. SINAITICUS GRAECUS 1244 (SEE FIG. 1)

MODE I



(1) Ἐν τῷ οὐ - ρα - νῷ (2) τὰ ὄμ - μα - τα ἐκ - πέμ - πω μου τῆς καρ -



δί - ας (3) πρὸς Σὲ Σω-τήρ (4) σὺ - σὸν με τῇ ἐ - πι - λάμ-ψει.

¹ Gastoué has, generally speaking, followed a plan similar to this.

² These are partly made up of verses from the Psalms. Examples given in W. Christ & Paranikas, *Anthologia*, p. 53. Our second example is on p. 54.

³ Text, *ibid.* p. 113.

(1) Ἀ - γί - ψ πνεύ - μα - τι (2) πα̇ - σα ἡ κτί - σις καιν - ουρ -
 γεί - ται· (3) πα - λιν - δρο - μου̇ - σα εἰς τὸ πρῶ - τον
 (4) ἰ - σο - σθε - νές γάρ ἐσ - τι Πα - τρὶ καὶ Λό - γω.

FROM STICHERA ANASTASIMA COD SINAIT GR. 1214

(1) Δεῦ - τε ἀν - υμ - νή - σω - μεν, λα - οί (2) τήν τοῦ σω - τῆ - ρος τρι -
 ῆ - με - ρον ἔ - γερ - σιν· (3) δι' ἧς ἐ - λυ - τρώ - θη - μεν
 (4) τῶν τοῦ Ἀι - δου ἀ - λύ - των δεσ - μῶν· (5) καὶ ἀ - φθαρ
 σί - αν καὶ ζω - ῆν (6) πάν - τες ἐ - λά - βο - μεν· κρά - ζον - τες.
 (7) ὁ σταυ - ρω - θεὶς καὶ τα - φεῖς καὶ ἀ - να - στα̇ς, (8) σῶ - σον ἡ -
 μᾶς τῇ ἀ - να - στα̇ - σει Σου, (9) μό - νε φιλ - ἄν - θρω - πε.

Riemann reproduces two pages of a fine MS. of the Linear System (Paris, Bibl. Nat. Fonds Coislin 220).¹ I select two

¹ *Op. cit.*, Pls. IV, V. In R's own version three of the seven odes appear to end on a wrong note—a difficulty scarcely to be avoided, as he suggests (p. 57) by giving the final Ison an indeterminate value. This would leave us without any criterion whatever for correct transcription. The Canon by Cosmas—*Χέρσον ἀβυσσότοκον*—to which these odes belong, is given in *Anthologia*, p. 172.

odes, which need no emendation. Mode III is like our scale of F major. In ode 8 at Q there seems to be a carelessly written Bareia; the combination still only equals a second downwards.

ODE 6, MODE III

(1) Ἐ - βό - η - σέν Σοι ἰ - δὼν ὁ πρέσ-βυς (2) τοῖς ὀφ - θαλ - μοῖς τὸ σω - τή - ρι - ον (3) ὁ λα - οῖς ἐπ - ές - τή (4) ἐκ Θε- οῦ, Χρισ - τε Σὺ Θε - ὅς μόν.

ODE 8, MODE III

(1) ἄ - στέκ-τω πυ - ρὶ· ἐν - ωσ-θέν - τες (2) οἱ θε - ο - σε - βεί - ας προ- εσ - τῶ - τες νε - α - νί - αι (3) τῇ φλο - γὶ δὲ μὴ λω - βῇ - θέν - τες (4) θεῖ - ον ἔμ - νον ἔ - μέλ - πον· (5) εὖ - λο - γεῖ - τε πάν - τα τὰ ἔρ - γα τὸν κύ - ρι - ον, (6) καὶ ὑ - περ - υψ - οῦ - τε αὐ - τὸν εἰς τοὺς αἰ - ῶ - νας.

It must not be thought that the majority of hymns in the Linear Notation can be read as easily as those given here. Owing to the uncertainty of value of many group-formulae, and the possibility of textual error, we can seldom be sure that our transcript is altogether right. The examination of a greater number of specimens, and further collation of various musical settings, should in time furnish us with a complete method of transcription. Such a result will be of the highest value for the history of mediaeval music.

H. J. W. TILLYARD.

UNIVERSITY OF EDINBURGH.